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EXAMINER

PASTERCZYK, JAMES W

ART UNIT	PAPER NUMBER
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1755

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.



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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 09/688,376  
Filing Date: October 11, 2000  
Appellant(s): BARBOTIN ET AL.

**MAILED**

**AUG 24 2004**

**GROUP 1700**

\_\_\_\_\_  
George Lesmes, Esq.  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 7/21/04.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

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**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The Appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The Appellant's statement of the issues in the brief is correct. The examiner notes that all 35 USC 112, second paragraph, grounds of rejection made earlier in the course of prosecution of the present application are now withdrawn.

**(7) *Grouping of Claims***

The rejection of claims 1-20 and 24 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

**(8) *Claims Appealed***

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A substantially correct copy of appealed claims 1-20 and 24 appears on pages A-1 to A-7 of the Appendix to the Appellant's brief. The minor error is as follows: in claim 20, the coefficient "n" on the formula should be subscripted to denote the number of X atoms on M'.

**(9) Prior Art of Record**

Hu et al., Chinese Science Bulletin, vol. 37, no. 7, pp. 566-570 (4/1992) ("Hu")

Jones et al., WO 92/17510, published 10/1992) ("Jones")

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu in view of Jones.

The present claims are drawn to a composition of matter comprising a solid supported catalyst for the polymerization of compounds having carbon-carbon double bonds, the composition having a rare earth metal that is pi bonded to an arene ligand and further bonded to three  $AlX_4^-$  anions, the rare earth metal thus having a formal 3+ oxidation state. Further independent claims are drawn to methods of making this supported composition, one that simply combines the rare earth metal compound with the support, another that first reacts the support with an aluminum trihalide in an aromatic solvent that forms the pi arene ligand followed by adding the rare earth trihalide, and yet another that concurrently combines the support, the aluminum halide, and the rare earth halide in an arene solvent.

Hu discloses a compound that reads on the rare earth metal compound of the present claims (abstract; experimental section, first paragraph).

Hu lacks disclosure that a support may be used for the compound, even though it was recognized as a catalyst for forming polymeric organic compounds having carbon-carbon single bonds from feedstocks containing carbon-carbon double bonds.

However, Jones teaches that rare earth metal compounds having pi arene ligands and catalytic activity may be supported on inorganic oxide support materials (abstract).

It would have been obvious to one of ordinary skill in the art to apply the teaching of Jones to the disclosure of Hu with a reasonable expectation of obtaining a highly-useful catalyst and method of making it with the expected benefit of being able to use the catalyst in gas phase and slurry phase polymerizations, these two techniques being among the most often commercially used olefin polymerization techniques.

**(11) Response to Argument**

In response to Appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the Appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In response to Appellant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge

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generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it is quite conventional to place olefin polymerization catalysts on supports, for example alumina or silica, two of the most prevalent support materials used in olefin polymerization catalysts and both reading on Appellant's support materials, so that the catalysts may be used in slurry phase or gas phase polymerization processes, for example in the Union Carbide UNIPOL<sup>TM</sup> process, one of the most prevalent olefin polymerization processes in use today. This would have been known to one of ordinary skill in the art, thus satisfying the requirements of the case law cited herein.

In response to Appellant's argument that Hu and Jones are nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, both references are drawn to compositions which convert monomers having C=C double bonds into oligomers or polymers having C-C single bonds in a chain, and it is within the skill of the routineer in the art to use ordinary H<sub>2</sub> as an agent that would regulate the length of the carbon atom chain in the process that forms the oligomers or polymers, thus determining whether the product is more oligomeric or polymeric.

Regarding Appellant's argument that the unpredictability of the catalyst art would argue against using an aluminum alkyl compound either as part of the composition or during its preparation, the examiner first notes that the unpredictability of the catalyst art cuts both ways;

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such unpredictability itself would argue that there is more need, not less, to experiment to discover whether something works in the catalyst art, thus providing in a sense yet another motivation to combine the references and look beyond what they themselves disclose; if the art were utterly predictable, there would be essentially no need to actually perform an experiment to determine whether or not the modification to what were known in the prior art would actually work.

As applied to this case, Jones in fact does teach at p. 4, l. 30 to p. 6, l. 2, that rare earth metal compounds would react so readily with surface hydroxyl groups ordinarily found on inorganic metal oxide compounds (see p. 5, l. 13 especially) that the catalytic activity of the rare earth compound would be destroyed, hence it would be desirable to limit the number of such groups found on the support material (Jones, p. 5, l. 14-19). Jones further teaches that there are two ways to go about decreasing the number of surface hydroxyl groups, one via simply heating the material, the other via addition of another additive that would react with the surface hydroxyl groups (Jones, p. 5, l. 17-22), but that complete removal of surface hydroxyl groups would be undesirable since these are the groups that actually chemically bond to the rare earth metal compounds, allowing the formation of a supported catalyst in the first place (Jones, p. 5, l. 26-35). Since heating under vacuum is an imprecise method of removing surface hydroxyl groups (see present claim 16), one of ordinary skill in the art would have been motivated to use the chemical method; this would allow an actual stoichiometric determination of how many hydroxyl groups were removed, and thus how many remained on the support material. Since the lone pair electrons on the oxygen atom of the hydroxyl groups is Lewis basic, a conventional reagent to react with them would be a Lewis acid, for example an aluminum alkyl or halide

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compound as found in present claim 9, step (ii), claim 12, step (i), claim 13 step b, and claims 14, 15, 17, 20 and 24. Appellant's statement that Jones suggests cocatalysts and activators should be avoided is thus a misstatement of its teaching; in proper amounts they contribute to the reactivity of the ultimate supported catalyst rather than destroy it.

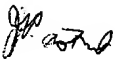
Finally, regarding Appellant's arguments regarding the oxidation states of the metal in the present rare earth compounds versus those of Jones, it is well-known that these oxidation states assigned based only on the formal charge of the ligands bonded to the metal are merely formal and do not necessarily correspond to the actual electronic configuration of the metal atom. An actual determination would require a technique such as x-ray photoelectron spectroscopy, which is difficult to practice and not normally the concern of practicing industrial chemists since it requires a compound that sublimes at a sufficiently practical sub-atmospheric pressure and results in a value for the actual oxidation state of the metal atom that is rarely actually usable outside of academia.



For the above reasons, it is believed that the rejections should be sustained.

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Respectfully submitted,

J. Pasterczyk  
August 19, 2004 

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